WHAT IS CLAIMED IS:

1. A piezoelectric resonant filter having frequency characteristic exhibiting a low frequency side attenuation extremum and a high frequency side attenuation extremum arranged on opposite sides of a pass band, said piezoelectric resonant filter comprising:

a plurality of thin-film piezoelectric resonators, each including a piezoelectric thin film having piezoelectric characteristic, and a pair of excitation electrodes disposed on opposite surfaces of said piezoelectric thin film for applying an excitation voltage to said piezoelectric thin film,

wherein a rate of frequency change in accordance with temperature change at a first frequency at which said low frequency side attenuation extremum appears is different from that at a second frequency at which said high frequency side attenuation extremum appears.

2. A piezoelectric resonant filter according to Claim 1, wherein said plurality of thin-film piezoelectric resonators are a combination of at least one series resonator and at least one parallel resonator for forming a ladder-type filter circuit;

said series resonator exhibits said high frequency side attenuation extremum whereas said parallel resonator exhibits said low frequency side attenuation extremum;

at least one of said series resonator and said parallel

resonator has a temperature compensating layer for bringing the rate of resonant frequency change in accordance with temperature change close to zero; and

thickness of said temperature compensating layer in said series resonator is different from thickness of said temperature compensating layer in said parallel resonators.

3. A piezoelectric resonant filter according to Claim 2, wherein said temperature compensating layer is made of silicon dioxide.

4. A piezoelectric resonant filter according to Claim 2, wherein each of said thin-film piezoelectric resonators further includes an acoustic multi-layer film having a plurality of layers different in acoustic impedance and disposed on a surface of one of said excitation electrodes opposite to said piezoelectric thin film so that said excitation electrode is sandwiched between said acoustic multi-layer film and said piezoelectric thin film.

5. A piezoelectric resonant filter according to Claim 4, wherein part of said plurality of layers in said acoustic multi-layer film serves as part of said temperature compensating layer.

6. A duplexer connected to an antenna, comprising:

a transmission filter for passing a transmission signal but cutting off a reception signal, said transmission filter having frequency characteristic exhibiting a first low frequency side attenuation extremum and a first high frequency side attenuation extremum arranged on opposite sides of a first pass band; and

a reception filter for passing the reception signal but cutting off the transmission signal, said reception filter having frequency characteristic exhibiting a second low frequency side attenuation extremum and a second high frequency side attenuation extremum arranged on opposite sides of a second pass band different from said first pass band;

said transmission filter as at least one of said transmission filter and said reception filter includes a plurality of thin-film piezoelectric resonators, each of said thin-film piezoelectric resonators having a piezoelectric thin film having piezoelectric characteristic, and a pair of excitation electrodes disposed on opposite surfaces of said piezoelectric thin film for applying an excitation voltage to said piezoelectric thin film; and

the rate of frequency change in accordance with temperature change at a frequency which is one nearer to said second pass band out of a frequency exhibiting said first low frequency side attenuation extremum and a frequency exhibiting said first high

frequency side attenuation extremum is lower than the rate of frequency change in accordance with temperature change at the other frequency.

7. A duplexer according to Claim 6, wherein said plurality of thin-film piezoelectric resonators in said transmission filter are a combination of at least one series resonator and at least one parallel resonator for forming a ladder-type filter circuit;

said series resonators exhibits said first high frequency side attenuation extremum whereas said parallel resonators exhibits said first low frequency side attenuation extremum;

at least one of said series resonator and said parallel resonator has a temperature compensating layer for bringing the rate of resonant frequency change in accordance with temperature change close to zero; and

the thickness of said temperature compensating layer in said series resonator is different from the thickness of said temperature compensating layer in said parallel resonator.

8. A duplexer according to Claim 7, wherein said temperature compensating layer is made of silicon dioxide.

9. A duplexer according to Claim 7, wherein each of said thin-film piezoelectric resonators further includes an

acoustic multi-layer film having a plurality of layers different in acoustic impedance and disposed on a surface of one of said excitation electrodes opposite to said piezoelectric thin film so that said excitation electrode is sandwiched between said acoustic multi-layer film and said piezoelectric thin film.

10. A duplexer according to Claim 9, wherein part of said plurality of layers in said acoustic multi-layer film serves as part of said temperature compensating layer.

11. A duplexer connected to an antenna, comprising:

a transmission filter for passing a transmission signal but cutting off a reception signal, said transmission filter having frequency characteristic exhibiting a first low frequency side attenuation extremum and a first high frequency side attenuation extremum arranged on opposite sides of a first pass band; and

a reception filter for passing the reception signal but cutting off the transmission signal, said reception filter having frequency characteristic exhibiting a second low frequency side attenuation extremum and a second high frequency side attenuation extremum arranged on opposite sides of a second pass band different from said first pass band;

said reception filter as at least one of said transmission filter and said reception filter includes a plurality of thin-film

piezoelectric resonators, each of said thin-film piezoelectric resonators having a piezoelectric thin film having piezoelectric characteristic, and a pair of excitation electrodes disposed on opposite surfaces of said piezoelectric thin film for applying an excitation voltage to said piezoelectric thin film; and

the rate of frequency change in accordance with temperature change at a frequency which is one nearer to said first pass band out of a frequency exhibiting said second low frequency side attenuation extremum and a frequency exhibiting said second high frequency side attenuation extremum is lower than the rate of frequency change in accordance with temperature change at the other frequency.

12. A duplexer according to Claim 11, wherein said plurality of thin-film piezoelectric resonators in said reception filter are a combination of at least one series resonator and at least one of parallel resonator for forming a ladder-type filter circuit;

said series resonator exhibits said second high frequency side attenuation extremum whereas said parallel resonator exhibits said second low frequency side attenuation extremum;

at least one of said series resonator and said parallel resonator has a temperature compensating layer for bringing the rate of resonant frequency change in accordance with temperature change close to zero; and

the thickness of said temperature compensating layer in said serie resonators is different from the thickness of said temperature compensating layer in said parallel resonators.

13. A duplexer according to Claim 12, wherein said temperature compensating layer is made of silicon dioxide.

14. A duplexer according to Claim 12, wherein each of said thin-film piezoelectric resonators further includes an acoustic multi-layer film having a plurality of layers different in acoustic impedance and disposed on a surface of one of said excitation electrodes opposite to said piezoelectric thin film so that said excitation electrode is sandwiched between said acoustic multi-layer film and said piezoelectric thin film.

15. A duplexer according to Claim 14, wherein part of said plurality of layers in said acoustic multi-layer film serves as part of said temperature compensating layer.

16. A duplexer connected to an antenna, comprising:

a transmission filter for passing a transmission signal but cutting off a reception signal, said transmission filter having frequency characteristic exhibiting a first low frequency side attenuation extremum and a first high frequency side attenuation extremum arranged on opposite sides of a first pass

band; and

a reception filter for passing the reception signal but cutting off the transmission signal, said reception filter having frequency characteristic exhibiting a second low frequency side attenuation extremum and a second high frequency side attenuation extremum arranged on opposite sides of a second pass band different from said first pass band;

each of said transmission filter and said reception filter includes a plurality of thin-film piezoelectric resonators, each of said thin-film piezoelectric resonators having a piezoelectric thin film having piezoelectric characteristic, and a pair of excitation electrodes disposed on opposite surfaces of said piezoelectric thin film for applying an excitation voltage to said piezoelectric thin film;

the rate of frequency change in accordance with temperature change at a frequency which is one nearer to said second pass band out of a frequency exhibiting said first low frequency side attenuation extremum and a frequency exhibiting said first high frequency side attenuation extremum is lower than the rate of frequency change in accordance with temperature change at the other frequency; and

the rate of frequency change in accordance with temperature change at a frequency which is one nearer to said first pass band out of a frequency exhibiting said second low frequency side attenuation extremum and a frequency exhibiting said second

high frequency side attenuation extremum is lower than the rate of frequency change in accordance with temperature change at the other frequency.

17. A duplexer according to Claim 16, wherein said plurality of thin-film piezoelectric resonators in said transmission filter are a combination of at least one of first series resonator and at least one of first parallel resonator for forming a ladder-type filter circuit;

said first series resonator exhibits said first high frequency side attenuation extremum whereas said first parallel resonator exhibits said first low frequency side attenuation extremum;

at least one of said first series resonator and said first parallel resonator has a temperature compensating layer for bringing the rate of resonant frequency change in accordance with temperature change close to zero;

the thickness of said temperature compensating layer in said first series resonator is different from the thickness of said temperature compensating layer in said first parallel resonator;

said plurality of thin-film piezoelectric resonators in said reception filter are a combination of at least one of second series resonator and at least one of second parallel resonator for forming a ladder-type filter circuit;

said second series resonator exhibits said second high frequency side attenuation extremum whereas said second parallel resonator exhibits said second low frequency side attenuation extremum;

at least one of said second series resonator and said second parallel resonator has a temperature compensating layer for bringing the rate of resonant frequency change in accordance with temperature change close to zero; and

the thickness of said temperature compensating layer in said second series resonator is different from the thickness of said temperature compensating layer in said second parallel resonator.

18. A duplexer according to Claim 17, wherein said temperature compensating layer is made of silicon dioxide.

19. A duplexer according to Claim 17, wherein each of said thin-film piezoelectric resonators further includes an acoustic multi-layer film having a plurality of layers different in acoustic impedance and disposed on a surface of one of said excitation electrodes opposite to said piezoelectric thin film so that said excitation electrode is sandwiched between said acoustic multi-layer film and said piezoelectric thin film.

20. A duplexer according to Claim 19, wherein part of

said plurality of layers in said acoustic multi-layer film serves as part of said temperature compensating layer.